

## IMPACTS OF GRAIN HANDLING AND TRANSPORTATION SYSTEM DEREGULATION ON FARM PROFITABILITY IN MANITOBA PROVINCE OF CANADA

ANNAMALAI AMUDHASURABI<sup>1</sup>, JARED CARLBERG<sup>2</sup>, DIGVIR S. JAYAS<sup>3</sup> & L. RAVIKANTH<sup>4</sup>

<sup>1</sup>Assistant Professor, Indian Institute Crop Processing Technology, Thanjavur, Tamil Nadu, India

<sup>2</sup>Associate Professor, Department of Agribusiness and Agricultural Economics, University of Manitoba, Winnipeg, Canada

<sup>3</sup>Distinguished Professor, Department of Biosystems Engineering, University of Manitoba, Winnipeg, Canada

<sup>4</sup>Graduate Student, Department of Biosystems Engineering, University of Manitoba, Winnipeg, Canada

### ABSTRACT

There is evidence from the literature that deregulating and restructuring measures in Canadian railways have impacted both Western Canadian grain farmers and the broader grain handling and transportation system (GHTS). However, these effects have not yet been fully explored. This paper considers one of the major deregulations: elimination of the Western Grain Transportation Act (WGTA) in 1995, through which the Canadian government eliminated a transportation subsidy for grains from farm to export points. In this study, the statistical significance was studied in differences of freight rate participation to farmer prices during the WGTA period and then after its elimination. Results of paired comparisons show that the removal of WGTA significantly reduced the farmer's profitability for wheat, durum and designated (malting) barley for export during the transition period. The elimination of the WGTA continued to have a negative impact on farmers' profitability even 15 years after its elimination. Besides increasing freight rate participation, price fluctuations in international markets also have a direct effect on farmers' profitability for the three crops selected for this study. The WGTA was designed to compensate farmers for losses due to price fluctuations during its existence. However, the irregular pattern of grain prices, coupled with subsidy removal, leaves the farmers in Manitoba in a worse position with respect to profitability.

**KEYWORDS:** Railway, Deregulation, Freight Rate, Profitability, Elimination, Transition

### INTRODUCTION

The Western Canadian grain industry has always relied heavily upon the grain handling and transportation system (GHTS), given that rail and roads play vital roles in movement of grain from farm to both processing and export positions. Freight-related regulations in the Western Canadian GHTS have been in place for more than a century. With the passing of the Crow's Nest Pass Act in 1897, the railways committed themselves to transport Prairie grains at fixed rates (the Crow Rate) in perpetuity, with no higher rates than the statutory maximum to be charged as of the dates specified in the Act (Kulshreshtha and Devine 1978). Freight rates applicable to the movement of Western Canadian grain remained unchanged for more than a half-century from 1927 to 1980 (Quorum Corporation 2011).

To deal with challenges facing the rail industry and allow the railways to perform independently and effectively, the Canadian government has introduced a number of regulatory changes throughout the history of the GHTS. The most important of these changes occurred in 1995, when the Canadian government removed the Western Grains Transportation Act (WGTA), ending the Crow Rate transportation subsidy. This was the first time in nearly a century that farmers were

required to pay the full cost of transportation of their grains to export positions (Klein and Storey 1998).

The objective of this paper is to determine the effects of the removal of the WGTA upon Manitoba farm profitability. This is accomplished by comparing trends in the share of farm prices required to cover freight costs compared to other GHTS costs for export-destined grain in the pre-WGTA, transition, and post-WGTA periods. Results of this study should result in an enhanced understanding of the impact of deregulation on farm profitability and perhaps offer some perspective of the influence of the recently-deregulated CWB on movements in freight rates. Furthermore, the inferences drawn by results of this study will enable a thorough analysis of future open-market scenarios in Western Canada.

## WGTA REMOVAL AND SUBSEQUENT CHANGES

Various studies have estimated effects on freight cost changes for Western Canadian grain in the post-WGTA era. According to Klein and Storey (1998) at the time of removal of the WGTA, Western Canadian producers were paying about half the total estimated transportation costs. Vercammen (1996) reported that the farm-level freight for a typical haul of 979 to 1,000 miles more than doubled, rising from \$14.27 per tonne in 1994-95 to \$29.42 per tonne in 1995-96. Rail deregulation, coupled with lower farm prices in Western Canada, has seen some farmers shift their production activities into the non-grain sector.

Klein and Storey (1998) observed, for example, that the resultant lower net farm income due to freight rate regulations stimulated growth of the livestock sector in Western Canada. Nolan and Skotheim (2008) note that the rail-related policy changes in the late 1990s led to higher pricing and service freedom in the railway industry. In a comparison with one of Canada's largest export market competitors, Parsons and Wilson (1999) argued that the Canadian grain transportation and handling system is highly inefficient compared to the United States, and showed that US freight and elevator rates have dropped during the post-1995 period. In the case of wheat destined for export, freight rates in Canada increased by \$20 per tonne from 1994-95 (the last crop year before elimination of the WGTA) to 1995-96 (the first year of regulatory transition). In the decade-and-a-half from 1995-96 to 2010-2011, the average freight rate was \$32 per tonne, constituting an average of 58% of the export basis (Figure 1). Freight rates were the highest among all logistical costs in the post WGTA period.

## METHODOLOGY

In this study, freight costs were calculated as a percentage of grain prices before the removal of the WGTA (1994-1995), during the latter stage of the WGTA transition period (1997-1998), and significantly into the post-WGTA period (2010-2011) in order to quantify the impact of the regulatory change for CWB crops (wheat, durum and designated barley) on an export basis for fifty randomly selected grain delivery points distributed within the Western Canadian province of Manitoba. Based on these comparisons, the significance of the elimination of the rail subsidy on producer profitability during the transition period and 15 years after the WGTA's elimination was examined.

The removal of the CWB's monopoly power for wheat, durum and designated barley has been a significant source of contention in the Western Canadian agricultural sector. Accordingly, the influence of the CWB on the impact of deregulation was also examined in the study. In order to test whether there are statistically significant differences in the freight rate shares relative to farm prices between the three periods of study, paired t-tests were performed using the TTEST procedure of Statistical Analysis Software (SAS 2012). To study trends in other logistics, costs and prices for wheat on an export basis in the post WGTA period, data were deflated to a common base year of 1999-2000.

## DATA

Freight rates for selected delivery points within Manitoba for the WGTA (1994-95) and transition periods (1997-98) for wheat, durum and designated barley on an export basis were obtained using Freight Rate Manager (FRM) version 2.1. FRM was developed at the University of Saskatchewan for the purpose of highlighting the effects of the WGTA removal on transportation costs from Western Canadian delivery points to export position by comparing pre-and post-WGTA freight charges for major crops. Freight rates for the selected delivery points for the period 2010-11 (15 years after elimination of the WGTA) were taken from the FRM, version 3.0, developed in 2011.

AverageCWB final realized prices(FRPs) for wheat for No.1Canada Western Red Spring (CWRS) 13.5% protein, No.1 Canada Western Amber Durum (CWAD) and designated barley(A grade-two row) for Manitoba were chosen as representative CWB crops. An FRP was calculated by deducting in-store CWB operating costs at St. Lawrence (eastern export position) or Vancouver (western export position). The percentage freight share of producer price was calculated for each crop during the three different periods for comparison purposes. The annual average CWB saving on transport for Manitoba in the year 2010-11 was calculated for the purpose of illustrating the significance of the CWB on freight rate costs to farmers.

## RESULTS

In the 1999-2000 to 2010-11 post WGTA periods, changes in freight rate percentage of marketing costs were modest from year to year for delivery points in Manitoba, and by 2010-11 were only 8.3% higher than in the base year of 1999-2000(Table1). Increases in other marketing costs were higher by greater amounts during the same period; for example primary elevator costs were over 28% higher, dockage and terminal costs went up by nearly 56%, and trucking costs increased by more than 65%. The greatest cost increases were in the gross costs of the CWB, which nearly tripled between 1999-2000 and 2010-2011. Trends in international wheat prices and yields are also presented in Table 1 as they also affect the profitability of exported wheat. Wheat prices showed an irregular pattern of change from year to year from 1999-2000 to 2010-11; wheat yields showed similarly irregular trends but were 12% higher at the end of the period of study compared with the beginning.

Paired comparisons of means for freight rates as a percentage of producer price on an export basis were carried out for wheat, durum and designated barley from selected delivery points in Manitoba. The comparisons were made between the WGTA period (1994-95), the transition period (1997-98) and 15 years after elimination of the WGTA (2010-11). These comparisons revealed a significant difference at the 5% level for wheat, durum and designated barley (Table 2). The increase in freight rate costs as a percentage of producer price was the highest for wheat, nearly tripling by 1997-98 compared with the WGTA period. The cost of freight for designated barley more than doubled, whereas for durum the increase was marginal at \$0.90 per tonne (but still statistically significant). Farmers' profitability during the transition period was thus affected in an important way by the removal of WGTA for all three CWB crops, but especially for wheat and designated barley. The lowest increase in freight costs as a proportion of producer price was experienced for durum and is partially due to the higher price of durum than the other two crops during the transition year 1997-98. The price of durum was 31% higher than wheat and 72% higher than designated barley at that time.

As shown in Table 2, freight rates as a proportion of farm price for wheat, durum and designated barley were statistically different at the 5% level between the WGTA period in 1994-95 and the end of the study period in 2010-11.

The increase in freight rate share of farm price was highest for designated barley; it was nearly three times more than in WGTA period, while for durum, the share nearly doubled. However, wheat showed only a marginal increase in freight rate share of farm price of \$2.90 per tonne before CWB transportation savings, which enabled farmers to save an average of \$0.60 per tonne in Manitoba. The higher freight cost as a percentage of prices for durum and designated barley compared with wheat could be due to the higher price of wheat than durum and designated barley in 2010-11 (Figure 2). The highly fluctuating export market prices affected farmers' decisions on crop choices. The decline in farmers' profitability due to depressed international market prices was partially offset by the WGTA subsidy. In the post WGTA period, farmers' profitability was highly correlated with movements in the price and yield series.

A comparison of the freight rate share of producer prices between the 1997-98 transition year and 2010-11 (15 years after elimination) in the post WGTA period revealed significant differences for both wheat and durum at the 5% level, while for designated barley, the difference was not significant (Table 2). Freight rate share of producer price varied uniquely for all the crops. For wheat, there was a decrease in the freight rate share of 49% even without the CWB transportation saving in the post WGTA period. The CWB transportation saving for wheat on an export basis enabled farmers to earn \$0.50 per tonne of additional profit. Due to this, in the post WGTA period farmers' profitability was not affected significantly for wheat on an export basis in Manitoba. For durum, the freight rate share of producer price between 1997-98 and 2010-11 in the post WGTA period was statistically different; there was an increase of \$3.00 per tonne on an export basis with the transportation saving of the CWB. Through that saving, producers could earn \$0.70 per tonne more for durum exports. The increase in freight rate share for durum was due to declines in durum prices in 2010-11 (Figure 2).

Durum prices were 15% lower than those of CWRS wheat and 4% lower than designated barley in 2010-11. Though durum is considered a premium crop, its profitability is sensitive to fluctuations in the international market price. Partly for this reason, the increase in freight rate share of farm prices significantly affected the farmers' profitability in the post WGTA period for durum. In the case of designated barley, the difference in freight rate share of producer prices between the transition year and 15 years after elimination of WGTA was not statistically different. The modest increase in freight rate share of prices in 2010-11 was \$0.60 per tonne compared with those of 1997-98. The non-significant difference in freight rate share of price suggests that farmers' profitability was not affected significantly for export-destined designated barley in Manitoba in the post WGTA period. This non-significant difference in the freight rate share between the transition year and 15 years after elimination of the WGTA is due to the gradual increase in the freight rates in the post WGTA period (Table 1) and price increases for designated barley in international markets. For example, the price of designated barley was 4% higher than durum in the 2010-11 crop year.

## CONCLUSIONS

The research reported in this paper suggests that the removal of the WGTA had a significant impact on the profitability of export destined wheat, durum and designated barley in Manitoba. A comparison of freight rates' share of farm prices between the WGTA, transition, and post WGTA periods showed statistically significant differences in farmers' relative expenditures on freight in the post WGTA period compared with the period when the subsidy was in effect and the transition period. There was a substantial increase (two-fold for designated barley and three-fold for wheat) in the share of farm price dedicated to covering freight rates during the transition period compared with the WGTA period. However, the increase in the freight rate share of price was not significantly affected for durum exports during the transition period.

The higher price of durum than both wheat and designated barley in international markets helped compensate for increases in freight rates.

The comparison of freight rate shares of farm prices between the WGTA period and 15 years after its elimination showed a significant difference for wheat, designated barley and durum. The freight rate share was three times higher for designated barley, two times higher for durum and \$2.90 per tonne higher for wheat. This implies that the effects of eliminating the WGTA were still being felt in Manitoba 15 years after the subsidy's elimination. Nevertheless, in the post WGTA period the rate of increase in freight rate has been very gradual. The comparison between the periods of transition and 15 years after elimination of the WGTA showed a decrease in freight rate share of farm price of 49% for wheat. By contrast, there was an increase in freight rate share of price of \$3.00 per tonne for durum and \$0.60 per tonne for designated barley. It may thus be fair to conclude that in the post WGTA period, farmers' profitability on durum was reduced as a result of removal of the WGTA, while profitability from export of designated barley and wheat was not significantly affected. The CWB transportation savings enabled farmers to save up to a maximum of \$1.00 per tonne in freight rate. This saving is too small to have a significant impact on producer profitability. Besides an increase in freight rate percentage of grain price due to elimination of WGTA, international market prices and crop yield also affected the farmers' ability to profitably export the three crops under consideration.

The increase in freight rate proportion of price after the elimination of the WGTA significantly affected farmers' profitability in the transition period for each of the three crops considered in this study. However, the profitability of durum was not significantly affected, due at least in part to its higher price in international markets than wheat and designated barley. In the post-WGTA period, largely due to a surge in durum export prices and increases in wheat and designated barley prices, the profitability of durum was affected by the regulatory change. During the WGTA period, farmers' profitability due to fluctuations in export price was partially offset by the WGTA subsidy coverage. Farmers' risk thus increased after the elimination of the subsidy, although other risk-management mechanisms were available to farmers.

## REFERENCES

1. Fulton, M., Baylis, K. Brooks, H. & Gray, R. (1998). The impact of deregulation in the export basis in the Canadian grain handling and transportation system. University of Saskatchewan, Saskatoon, SK, Canada.
2. Klein, K. K. & Storey, G. (1998). Structural developments in the Canadian grains and oilseeds sector. In Lyons, R. M. A., R. D. Knutson, and M. Karl (eds.) Economic Harmonization in the Canadian\U.S.\Mexican Grain-Livestock Subsector. Proceedings of the 4th Agricultural and Food Policy Systems Information Workshops. Paper No. 16758, 22-25 April, 1998, Lake Louise, MB, Canada.
3. Kulshreshtha, S. N. & Devine, D. G. (1978). Historical perspective and propositions on the Crow's nest pass freight rate agreement. Canadian Journal of Agricultural Economics, 26 (2), 76-83.
4. MAFRI. (2013). Guidelines for estimating crop production costs. Manitoba Agriculture, Food and Rural Initiatives, Winnipeg, MB.
5. Nolan, J. & Skotheim, J. (2008). Spatial competition and regulatory changes in the grain handling and transportation system in western Canada. The Annals of Regional Science, 42 (4), 929-944.
6. Parsons, G. & Wilson, W. W. (1999). Grain Handling and Transportation Systems: A Canada-United States

Comparison. Study Prepared for Organization for Western Economic Cooperation, Regina, SK, Canada.

7. Quorum Corporation. (2011). Traffic, market and logistical changes in the western GHTS: 1980 to 2010. Monitoring the grain handling and transportation system supplementary work item. <http://www.quorumcorp.net/Downloads/Supplementalreports/TraffMktLogChanges1980-2010.pdf>. Accessed 17 May 2013.
8. Quorum Corporation. (2012). Monitoring the Canadian grain handling and transportation system. Annual report, 2011-2012 crop year. <http://www.quorumcorp.net/Downloads/AnnualReports/AnnualReport201112.pdf>. Accessed 17 March 2013.
9. SAS (Statistical Analysis Software). 2012. SAS/STAT software: Changes and enhancements through Version SAS 9.1.3, SAS Institute Inc. Cary, NC, USA.
10. Vercammen, J. (1996). An overview of changes in western grain transportation policy. Canadian Journal of Agricultural Economics, 44 (4), 397-402.

## APPENDICES

**Table 1: Trends in Other Costs, Price and Yield Compared with Freight in Post WGTA Period for Manitoba - CWRS Wheat on Export Basis (Indexed with Base Year 1999-2000)**

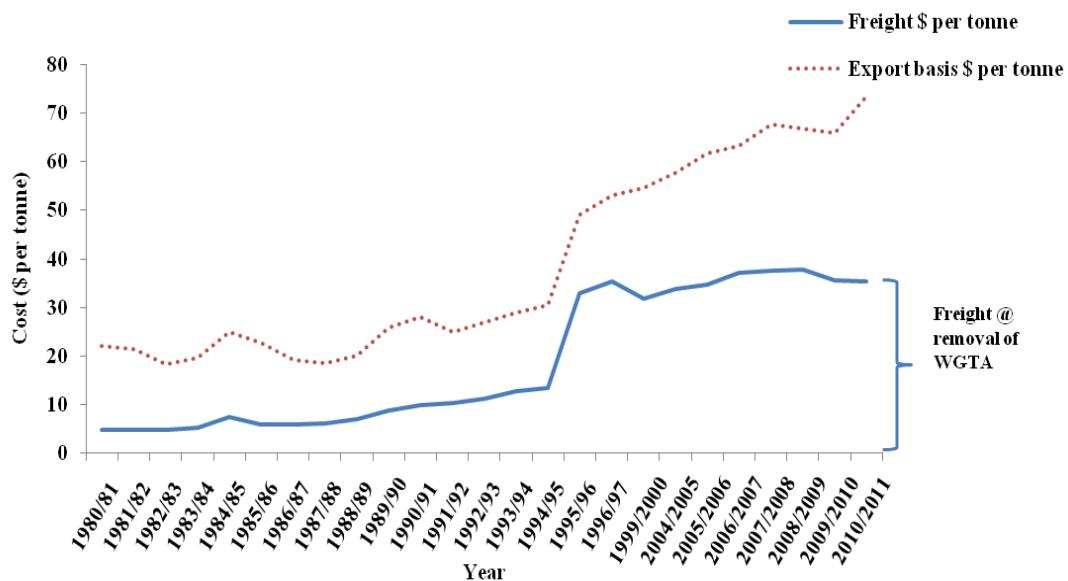
Year	Freight Cost	Trucking Cost	Primary Elevator Cost	Dockage-Terminal Cleaning Cost	CGC Weighing & Inspection Cost	CWB Costs - gross Cost	Cost of Production (Total Cost Basis)	Cost of Production (Operation Costs + Labour basis)	Price for 1 CWRS	Yield
	Index									
1999-2000	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
2004-2005	112.17	110.10	112.82	119.94	100.00	120.37	91.33	92.12	109.79	120.00
2005-2006	114.34	121.89	114.23	125.93	100.00	169.63	127.52	128.00	103.41	88.00
2006-2007	114.73	130.64	115.83	131.05	100.00	150.74	100.34	101.90	121.08	116.00
2007-2008	120.36	134.34	121.77	136.47	100.00	215.56	110.40	109.20	216.49	108.00
2008-2009	114.21	136.20	124.13	142.74	100.00	187.78	97.7	99.72	170.33	132.00
2009-2010	105.08	136.20	124.13	150.14	100.00	226.67	106.12	109.62	118.06	132.00
2010-2011	108.30	165.32	128.28	155.84	100.00	306.67	129.74	127.74	214.57	112.00

**Sources:** Quorum Corporation (2012) and Manitoba Agriculture, Food and Rural Initiatives (2013). Note: The cost and prices are in dollars per tonne and crop yield is in tones per hectare. \* CGC = Canadian Grain Commission, CWB = Canadian Wheat Board, CWRS = Canada Western Red Spring Wheat.

**Table 2: Comparison of Freight Rate Percentage Share of Producer Prices of Wheat, Durum and Designated Barley in Pre-WGTA, Transition, and Post-WGTA Periods**

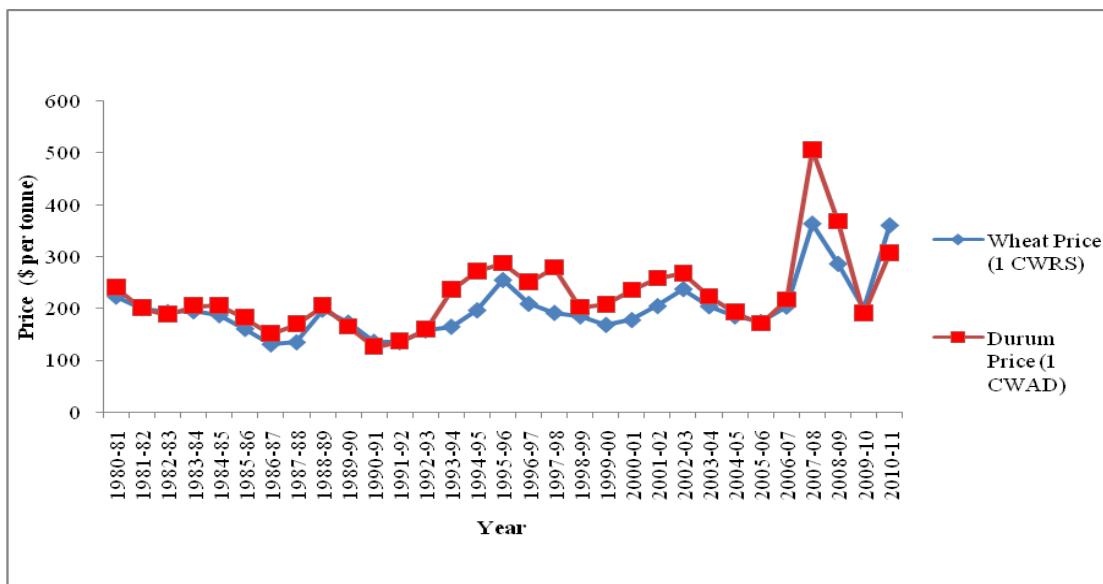
Period of Comparison	Grain Type		
	Wheat	Durum	Designated Barley
1994-95 vs 1997-98	59.91*	9.33*	20.91*
1994-95 vs 2010-11 (without CWB transport saving)	20.31*	29.51*	45.66*
1994-95 vs 2011 (with CWB transport saving)	16.55*	25.60*	--
1997-98 vs 2010-11 (without CWB transport saving)	39.10*	22.62*	1.74
1997-98 vs 2010-11 (with CWB transport saving)	41.74*	18.98*	--

\* indicates statistical difference at 5% significance level. \* CWB = Canadian Wheat Board.



Sources: Fulton et al. (1998) and Quorum Corporation (2012)

**Figure 1: Transition of Components of Wheat on Export Basis for Western Canada during and after the WGTA**



**Figure 2: Comparative Trends in Annual Average Prices for Wheat and Durum on Export Basis for Manitoba Province**

